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Applicant	:	Daniel A. FORD et al.	
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37 C.F.R. 1.131 DECLARATION

I, the undersigned, inventors of the above-referenced patent application, hereby declare the following:

1) The pending claims of our above identified patent invention were rejected under 35 U.S.C. §102(e) based on the prior art reference of Fomukong et al. (U.S. 6,441,752) with a filing date of December 30, 2000. (hereinafter referred to as "Fomukong").
2) The invention described in the above referenced patent application was reduced to a writing and signed by the undersigned applicants prior to the December 30, 2000 filing date of Fomukong. In particular, the relevant portion of our Invention Disclosure upon which the above referenced patent application was based is attached herewith.

We, the undersigned, declare all of the above statements are made on our own knowledge, the above statements are true and correct, and the above statements are made on information that we believe to be true. We understand that false statements or concealment in obtaining a patent will subject us to fine and/or imprisonment or both (18 U.S.C. §1001) and may jeopardize the validity of the above identified patent application or any application issuing therefrom.

Daniel A. Ford	Reiner Kraft *	Jussi P. Myllymaki
May 14, 2004	May ___, 2004	May 14, 2004

* - Unavailable for signature under MPEP § 715.04

Disclosure ARC8-2000-0277

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IDT Team	
Submitted Date	
Owning Division	
PVT Score	
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Technology Code	

Inventors with Lotus Notes IDs

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Inventor Name > denotes primary contact	Inventor Serial	Div/Dept	Manager Serial	Manager Name
>				

Inventors without Lotus Notes IDs

IDT Selection

IDT Team:	Attorney/Patent Professional:

Response Due to IP&L :

Main Idea

***Title of disclosure (in English)**

Personal Hailing and Communication System based on GPS integration

Idea of disclosure

1. Describe your invention, stating the problem solved (if appropriate), and indicating the advantages of using the invention.

The proposed invention will integrate new emerging Internet technologies, with GPS, PDA, and wireless connections in order to provide a centralized person or automobile hailing service, so that users of the invention are able to quickly select an adjacent or close car (or person). In addition, the invention will provide the functionality of sending voice/data messages to the driver of this previously selected car or person. This section comprises

1. Problem Description
2. Proposed Solution
3. Advantage and Benefits

1. Problem Description

With today's technology it is not possible to deliver a voice or data message to an arbitrary car or person close-by or adjacent to the own physical position. The reason mostly is that

a) One might not know an adjacent person, and his/her preferred communication devices
b) Even if a communication device is known (e.g. cell phone), the phone number or network id is not known, so a communication link cannot be established
c) The communication devices might not be compatible (person A: cell phone, person B: PDA), so a direct communication link cannot be established

In this scenario if two persons would be adjacent (e.g. over a distance of 50 meter), and both would have cell phones, person A would have to shout the cell phone number to person B (assuming that they already know that both of them are using a cell phone and carry it with them, and they do not know each other). If these persons are moving (e.g. each of them sits in a car), this kind of voice communication would not even be possible. There might be still some cumbersome alternatives (one could write a phone number on a piece of paper while driving, showing the number through the window), but it would be desirable to have a system, which would facilitate instant communication

Some scenarios, what one could do using the system:

- yelling at a car that cut you off in traffic
- saying thank to drivers who give you a break
- flirting
- ordering goods or services
- providing help by delivering important information

To allow instant communication, the following functionality needs to be provided

a) a system would have to associate a person to his/her current physical location
b) location information of participating persons have to be continuously updated while a person is moving
c) a location query needs to result in the associated person
d) a person is associated with a user profile comprising communication preferences, devices, and protocol
e) eventually a location query will be used to establish a communication link between at least two persons

In section two we will describe how to establish a communication link between two people.

People might also use some form of transportation (car, bike, etc.). The hailing system described below is not limited to various kinds of transportation systems, or to the fact that people are moving. In addition, we use GPS for location tracking. As new location tracking technologies arise, these might be embraced by the proposed system, and used as a replacement or extension to GPS.

2. Proposed Solution

In a preferred embodiment the system we propose comprises two components:

a) GPS client wireless component
b) Communication Management Server (or Hailing Coordination Server)

A more complete description of the system will be provided in section 2.

A person who uses the system will use a GPS client wireless component (e.g. cell phone, PDA, etc.). A user is registered with the Hailing Coordination Server, and has a user profile managed by this component. All communication between the GPS client wireless component and the Hailing Coordination Server can be based on existing Internet technologies. The profile data contains communication preferences, communication devices, and protocols. Location data of a user is continuously tracked by the Hailing Coordination Server. Incoming location queries can be made using an appropriate GUI and are then translated into persons. Query results are returned from the Hailing Coordination Server to the GPS client. The GPS client wireless component is then able to use this information in order to establish directly a communication link between a selected adjacent or close-by person. In a preferred embodiment a person might have a special hailing device, which can be used to perform the communication. This is however not required.

Overall the invention solves the problems described above, and provides the desired functionality.

There are some privacy concerns, since not everyone who uses the system wants to be available to be hailed by anybody. A user can achieve this by setting preferences (similar like this is done by instant messenger applications)

3. Advantage and Benefits

The proposed system facilitates communication between two persons. Note that these persons do not have to know each other. Nor do they need to know which communication device the other person is using, communication protocols etc. Since the Internet is all about communication, the personal hailing system represents a step forward helping people to quickly communicate. It will be the next evolution step of Instant Messaging, which is currently gaining more and popularity. Thus the invention will have high value and needs to be protected.

2. How does the invention solve the problem or achieve an advantage,(a description of "the invention", including figures inline as appropriate)?

Figure 1 shows a block diagram of the system. The system includes two main components:

1. GPS client wireless component (2)
2. Communication Management Server (3)

The number in parenthesis refers to the numbers in figure 1

System Architecture.do

[Figure 1 System Architecture]

Each of these main components comprises of the following sub components (see also figure 1), shown below:

- GPS

- GPS Client Wireless Component
- Session Manager
- GPS Interface
- WAN Interface
- GUI / Communication Device
- GPS Antenna
- WAN Transceiver Antenna
- I/O Device

- Communication Management Server
- Session Manager
- WAN Interface
- Location DB
- Profile DB
- Communication Request Handler
- Proximity Service
- Profile Manager

The following section describe each component in detail.

GPS 1 is the existing "Global Positioning System" (GPS) satellite based position determination system developed by the US Department of Defense. We use GPS technology for determining the position of participating users of the personal communication system. As mentioned above we are not limited to GPS, as new emerging position tracking technologies become available.

1. GPS Client Wireless Component

The **GPS Client Wireless Component** 2 (CWC) may be implemented within a laptop computer, cell phone, personal digital assistant (PDA), or integrated in a car system having a wireless wide area network (WAN) connection 23 for communicating with Communication Management Server 3. CWC includes a GPS interface 22 for receiving location information. Tasks of this component are to know where the location of the current user is, and then to send this information to the Communication Management Server 3. In addition, the CWC will receive data from the Communication Management server 3 and displays it for the user on a display device 27a (position of adjacent persons, list of possible or preferred communication devices of these adjacent persons).

The GPS client wireless component 2 operates under the control of the respective **Session Manager** 21. The session manager 21 is responsible for the interaction between the sub components of the CWC. It prepares the incoming data, such as location and data to send them either further to the Communication Management Server 3 over the WAN interface 23 or displays them over the GUI 24 on a screen 27a.

The **GPS Interface** 22 is implemented as a miniaturized GPS receiver that measures the time a radio signal needs from a GPS satellite in the GPS system 1 until it arrives at the GPS antenna 25. By knowing the speed of the radio signal (approx. the speed of light) and when each signal

is transmitted, the distance to each of the satellite can be determined. The final solution of the equations produces an exact position of the antenna 25 (latitude, longitude). The GPS receiver interface 22 determines a current location of the GPS client wireless component 2 and supplies the current location to the session manager 21.

The **WAN Interface** 23 supports a wireless connection to the Internet. With this interface the GPS client wireless component 2 can always be connected to the Communication Management Server 3.

The graphic user interface 24 **(GUI)** is implemented in the GPS client wireless component 2 for an easy-way to configure and to administrate it. Users have to be able to initiate communication requests conveniently. This can be done by providing them with an intuitive GUI (e.g. radar screen, where adjacent persons are represented with icons or picture thumbnails of their faces), speech input, or a combination of both. Users can then select adjacent persons by selecting the icon, which represents this person. Once a person is selected, a communication request to this person can be initiated. Alternatively, more information about this person can be displayed (public user profile, available communication devices).

In addition, a wireless communication device (e.g. cell phone, PDA) will be integrated into the GPS Client Wireless component. This device allows the communication between persons. Communication can be based on text (email, instant messaging), voice (talking), or video (or any combination of those). The user might also have additional external devices (e.g. an existing cell phone). In this case the GUI would allow to setup a profile for all these communication devices. Communication requests would then be forwarded to these devices based on user preferences in order to automatically establish a communication link. In case of legacy communication devices the GUI could display the address or phone number of the desired person. So the person could use this information to manually establish a communication with the adjacent person. There are various ways of how to implement this: The communication device is integrated into the GPS Client Wireless Component, or it is external, or it's a combination of both.

A **GPS Antenna** 25 connects to the GPS interface 22 to receive GPS data from the GPS satellite system.

The **WAN Transceiver Antenna 26** is for the wireless connection to the Internet. It is connected to the WAN interface 23 of the GPS client wireless Component 2.

The **Output Device** 27a may be implemented as a display of a wireless device and the **Input Device** 27b as a touch screen. The touch screen is used for manually user inputs and configuration. The display is for output of messages.

2. Communication Management Server

The **Communication Management Server** 3 receives the current physical location from connected users, and communication requests or queries. Location information will be continuously stored in the Location DB. Overall this component is the central processing unit to a) track location of persons b) resolves location/person queries c) selects a way for communication.

The **WAN Interface** 32 supports the connection to the Internet for the communication / interaction between the server 3 and user clients 2.

The **Session Manager** 31 gets the location information of users over the WAN interface 32. It stores this information in a location database 35. It also receives communication requests, and

forwards those to the Communication Request Handler 33, which then is responsible to establish a communication. In addition, each change in location of a user will trigger an event and notifies the Proximity Service 36. The proximity service then has to recalculate proximity relations.

Proximity Service

If a person moves his/her current location changes continuously. The proximity service receives an event from the Session Manager 31, and has then to look for persons who are adjacent. Adjacent person user ids (and their location) will be sent back to the client device, which can represent these adjacent persons using some graphical representation (icons, etc.) Performance and scalability of this component is critical. As the number of user grows, the amount of computations will grow exponentially. Thus it's important to optimize the computation of this component using efficient algorithms for calculating proximity in order to reduce complexity. However, these algorithms are not part of the invention, and will therefore not described in detail at this point.

The **Location DB** 34 may be implemented as a database to store the current locations of users, and also the currently adjacent persons. Since a user is moving almost continuously, and events are also highly dynamic, this database has to implemented efficiently for fast access and retrieval. The user location record could look like as follow: (user id, location in latitude/longitude, list of current adjacent persons). The session manager will update the location records, once new location information arrives.

The **Profile DB** 35 contains information about the user itself, his/her preferred communication devices and protocols etc., which is needed to establish a communication link between two persons

The **Profile Manager** component 38 manages the Profile DB 35. It updates records for a user. The User can set his profile over the Internet with his/her client device.

The **Communication Request Handler** 33 handles an incoming communication request. It knows the user ids of both persons, between the communication link has to be established. The task of this component is to select a protocol and device, which both user share in common, so that a communication can be established. This information can be obtained from the Profile DB 35. If both users have an integrated communication device 23, it is easy to establish the connection. However, if both users are using different devices/protocols, it will become more complex. For instance there might be then an additional component necessary, which would translate from one device to another. Consider person A uses a cell phone. Person B only has a two-way text based pager to receive messages. In this case the voice input of Person A would need to be converted into text (using existing speech recognition technology), which can then be transmitted to **Person B's** pager. The invention addresses this problem of different external communication devices, but will not cover all the details for this embodiment. In a preferred embodiment the communication device 23 would be integrated into the system to facilitate instant communication

Furthermore, a user might have different rules from whom to accept calls, or reject call requests. There are privacy issues, and each user needs to be able to adjust the system to his/her personal preferences. These preferences would then also be stored in the Profile DB 35

Computing distance between any two locations

Distance in Kilometers between any two locations on the planet gives their latitude and

longitude is:

```
Lat1    = Latitude of first position (degrees)
Lat2    = Latitude of second position (degrees)
Long1 = Longitude of first position (degrees)
Long2 = Longitude of second position (degrees)

Distance (kms) = 1.852 * 60 * ArcCos( SIN(Lat1) * SIN( Lat2 ) + COS( Lat1 )
* COS( Lat2 ) * COS( Long2 - Long1 ))
```

This is software code that computes the distance between to lat/long positions.

```
/**
* Calculate the distance between two positions.  This computes the great circle *
distance which assumes that the earth is a perfect sphere.  There are more
* accurate methods, check out http://www.auslig.gov.au/geodesy/datums/distance.htm
* @param p1 the latitude and longitude of the first position
* @param p2 the latitude and longitude of the first position
* @returns the distance in kilometers between the two positions
*/

static public double computeDistance( LatLongPosition p1, LatLongPosition p2 ) {
  // Radians conversion factor

  final double c = Math.PI/180.;
  final double knotKm = 1.852; // 1 nautical mile = 1.853 kms

  double      l1=c*( p1.latNS == SOUTH ? -1. : 1.)*(p1.latDegrees +
                (p1.latMinutes/60.));
  double      l2=c*( p2.latNS == SOUTH ? -1. : 1.)*(p2.latDegrees +
                (p2.latMinutes/60.));
  double      g1=c*( p1.longEW == WEST ? -1. : 1.)*(p1.longDegrees +
                (p1.longMinutes/60.));
  double      g2=c*( p2.longEW == WEST ? -1. : 1.)*(p2.longDegrees +
                (p2.longMinutes/60.));


  double      dg    =     g2     -     g1;

  double kms = knotKm * 60 * (Math.acos( Math.sin( l1 ) * Math.sin( l2 ) +
               Math.cos( l1 ) * Math.cos( l2 ) * Math.cos( dg )))/c;
  return kms;
} // computeDistance
```

Draft Disclosure

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Summary

Status	
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PVT Score	
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Inventors with Lotus Notes IDs

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Inventor Name > denotes primary contact	Inventor Serial	Div/Dept	Manager Serial	Manager Name
>	N/A	N/A	N/A	N/A

Inventors without Lotus Notes IDs

IDT Selection
Main Idea

***Title of disclosure (in English)**
System and method for contacting nearest person or facility in a wireless network

***Idea of disclosure**
1. Describe your invention, stating the problem solved (if appropriate), and indicating the advantages of using the invention.

Rapid advances are being made in the field of wireless communication. An increasing number of applications are being developed for the wireless device platform, ranging from smart cellular phones to two-way text pagers. By the year 2001, new cellular phones are required to have a location-tracking device based on the global positioning system (GPS). This gives rise to systems that deliver real-time, location-based information and services to wireless subscribers.

One common use for wireless devices, especially cellular phones, is that of security. When in a dangerous or difficult situation, one can request help from rescue departments (police, fire), companies (roadside assistance), and friends and family. When in danger, however, what counts is the speed at which help can be provided. The problem with today's systems is that the party one would call for help might not be the nearest one, potentially leaving the user vulnerable for an extended period of time

The present invention allows the user to contact the nearest person or facility by automatically calling their cellular or regular phone number when the user transmits a distress signal. The system will automatically identify who else is in the vicinity of the user and what phone number should be used to alert them. A broadcast within a limited circle (e.g. anyone within a 500 foot radius of the user) is also possible. This

feature greatly enhances personal safety. For instance, lone joggers or bicyclists will feel safer because they know that help is on hand nearby.

2. How does the invention solve the problem or achieve an advantage,(a description of "the invention", including figures inline as appropriate)?

The architecture of the system is described below. The components are:

1. Location Tracker
2. Location Tracking Database
3. Distress Signal Handler

1. Location Tracker

The Location Tracker is responsible for retrieving the location information of each user and storing it in the Location Tracking Database. Software in the wireless device of the user is modified so that it periodically sends its GPS coordinates (latitude and longitude) to the Location Tracker. The information is marked with a timestamp and stored in the Database

2. Location Tracking Database

The Location Tracking Database stores the GPS coordinates (latitude and longitude) of each user. The database records have the following schema: location(user, device, timestamp, location) where user is a unique identifier for each user, device identifies the type and model of the user's wireless device, timestamp contains the date and time the data was captured, and location is the GPS coordinate pair.

3. Distress Signal Handler

This component retrieves information from the Location Tracking Database as well as public telephone directories to locate a person(s) or facility(ies) that are nearby. The distance between the user and other wireless users is calculated from the GPS coordinates in the Location Tracking Database. The distance between the user and regular (wire) phones is calculated from the GPS coordinates of the user and those of the street address listed in the public telephone directory. The user's coordinates, as well as the type of distress, are transmitted to the person(s) or facility(ies) that are nearby.

Architecture of the System for Contacting Nearest Person

Figure 1. Architecture of the System for Contacting Nearest Person or Device.

3. If the same advantage or problem has been identified by others (inside/outside IBM), how have those others solved it and does your solution differ and why is it better?

Much work exists in the area of transmitting a distress signal to a predefined party, e.g. roadside assistance service, police or fire department, or family members. This invention transmits the distress signal to the nearest person or facility, greatly reducing the delay in delivering assistance to the user.

System and method for contacting nearest person or facility in a wireless network

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Jussi Myllymaki

Goal

- Allow user to call for help on his/her wireless device
  - Nearest person
  - Nearest house
  - Nearest facility that can provide help
- Provide a safety net for
  - Joggers, bicyclists, hikers
  - Visitors in an unfamiliar territory
  - Children

Problem

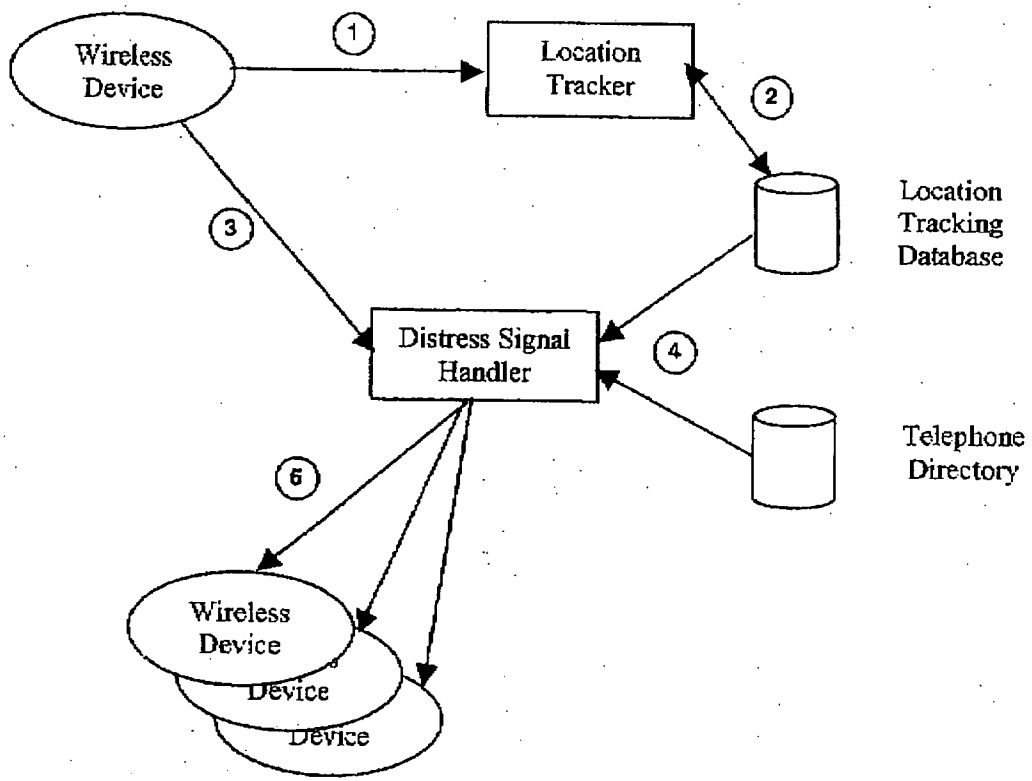
- Many people carry a cell phone for personal safety
  - Call police or fire department
  - Call service provider (e.g. roadside assistance)
  - Call friends and family
- The party called is not necessarily the nearest one who can offer help
  - User is potentially left vulnerable for an extended period of time

This Invention

- Collects contact and assistance information from public sources e.g. telephone directories
- Handles user's distress signal
  - Contact nearest person, house, or facility
  - Broadcast to nearby persons, houses, or facilities
- Helps user to receive assistance quickly

System Architecture

- Location Tracker – collects users' location data
- Location Tracking Information – stores location data
- Distress Signal Handler – processes user's call for help



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